SEQUENCE LISTING

<120> Cloning and Characterization of the Broad-Spectrum Resistance Gene Pi2 <130> 035718/268948 <150> 60/455,713 <151> 2003-03-18 <150> 60/409,216 <151> 2002-09-09 <160> 15 <170> FastSEQ for Windows Version 4.0 <210> 1 <211> 2982 <212> DNA <213> Oryza minuta <220> <221> CDS <222> (1)...(2982) <400> 1 atg gcg gcg gag acg gtg gtg agc atg gcg atg tcg gtg ctg ggc agc Met Ala Ala Glu Thr Val Val Ser Met Ala Met Ser Val Leu Gly Ser 10 gcc gtc ggg aag gcc gcc tcc gcc gcc gcc gac gag gcc acc ctc ctg Ala Val Gly Lys Ala Ala Ser Ala Ala Ala Asp Glu Ala Thr Leu Leu ctc ggc atc cag aag gag atc tgg tac atc aag gac gag ctg aaa act 144 Leu Gly Ile Gln Lys Glu Ile Trp Tyr Ile Lys Asp Glu Leu Lys Thr att cag gca ttc tta aga gct gct gaa gta aca aag aag aaa gat gac Ile Gln Ala Phe Leu Arg Ala Ala Glu Val Thr Lys Lys Asp Asp 50 55 60 ttg cta aag gta tgg gca gag caa gta cga gat ctg tca tat aac att Leu Leu Lys Val Trp Ala Glu Gln Val Arg Asp Leu Ser Tyr Asn Ile 65 288 gaa gat tgc cta gac gaa ttc aag gtt cat gtt gag agc caa agc ttg Glu Asp Cys Leu Asp Glu Phe Lys Val His Val Glu Ser Gln Ser Leu qca aaq caa cta atg aag ctt ggt gaa cgc cat cga att gct gta cag 336 Ala Lys Gln Leu Met Lys Leu Gly Glu Arg His Arg Ile Ala Val Gln 100 105

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agg Arg 145	gat Asp	tcc Ser	tac Tyr	cta Leu	gaa Glu 150	gat Asp	gct Ala	cgc Arg	aat Asn	cga Arg 155	tca Ser	ggt Gly	agc Ser	aac Asn	act Thr 160	480
gac Asp	gag Glu	tca Ser	gaa Glu	ctt Leu 165	gtg Val	ggc Gly	ttt Phe	gcc Ala	aag Lys 170	act Thr	aaa Lys	gat Asp	gag Glu	ttg Leu 175	ctt Leu	528
aaa Lys	ctg Leu	ata Ile	gat Asp 180	gtc Val	aat Asn	act Thr	aat Asn	gac Asp 185	ggt Gly	cca Pro	gct Ala	aaa Lys	gtg Val 190	ata Ile	tgt Cys	576
gtg Val	gtt Val	ggt Gly 195	atg Met	ggt Gly	gga Gly	tta Leu	ggc Gly 200	aag Lys	act Thr	acc Thr	ctt Leu	gca Ala 205	agg Arg	aag Lys	gca Ala	624
tat Tyr	gaa Glu 210	aac Asn	aag Lys	gaa Glu	cac His	atg Met 215	aag Lys	aac Asn	ttc Phe	tcg Ser	tgt Cys 220	tgt Cys	gct Ala	tgg Trp	atc Ile	672
act Thr 225	gtg Val	tct Ser	cag Gln	tca Ser	ttt Phe 230	gac Asp	agg Arg	aaa Lys	gaa Glu	att Ile 235	ctg Leu	aaa Lys	caa Gln	atg Met	atc Ile 240	720
agg Arg	caa Gln	ctt Leu	ctg Leu	ggt Gly 245	gct Ala	gat Asp	tca Ser	tta Leu	gac Asp 250	aaa Lys	ctc Leu	ttg Leu	aaa Lys	gaa Glu 255	ttt Phe	768
agt Ser	gag Glu	aag Lys	ttg Leu 260	ctc Leu	gtg Val	caa Gln	gtc Val	cag Gln 265	cat His	ctc Leu	gct Ala	gat Asp	cac His 270	ttg Leu	gtt Val	816
gaa Glu	Gly 999	cta Leu 275	aag Lys	gag Glu	aaa Lys	agg Arg	tac Tyr 280	ttt Phe	gtt Val	gtc Val	ctt Leu	gat Asp 285	gac Asp	cta Leu	tgg Trp	864
acc Thr	ata Ile 290	gat Asp	gca Ala	tgg Trp	aat Asn	tgg Trp 295	att Ile	cat His	gat Asp	att Ile	gct Ala 300	ttt Phe	ccg Pro	aag Lys	att Ile	912
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gct Ala	gga Gly	agg Arg	tgt Cys	acc Thr 325	tct Ser	gaa Glu	tca Ser	ctt Leu	att Ile 330	tac Tyr	cac His	ctt Leu	gaa Glu	ccg Pro 335	tta Leu	1008
cat His	ata Ile	gat Asp	gat Asp 340	Ala	ata Ile	cac	ttg Leu	cta Leu 345	Leu	gca Ala	aag Lys	aca Thr	aac Asn 350	Ile	aga Arg	1056
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ttt Phe	ggc Gly	gac Asp	aga Arg	cct Pro 565	gtg Val	ggg ggg	cga Arg	aca Thr	cct Pro 570	Ala	ctt Leu	tgt Cys	tca Ser	cca Pro 575	caa Gln	1728
ttt Phe	agg Arg	atg Met	ctg Leu 580	Arg	gtg Val	ttg Leu	gat Asp	ctg Leu 585	gaa Glu	gat Asp	gca Ala	aaa Lys	ttc Phe 590	Lys	ttc Phe	1776
aca Thr	caa Gln	aat Asn 595	Asp	atc Ile	aga Arg	aat Asn	ata Ile 600	Gly	ttg Leu	ttg Leu	cgc Arg	cac His 605	Met	aaa Lys	tat Tyr	1824
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gga Gly	aaa Lys	ttg Leu	cag Gln	tgc Cys	ttg Leu	caa Gln	att	ttg Leu	aac Asn	atg Met	agg Arg	gag Glu	gca Ala	aat Asn	atc Ile	1920

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_	-	_				ggt Gly					_			_		2016
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	_			-	-	gcg Ala 775			_				_			2352
						gga Gly										2400
						cct Pro										2448
aat Asn	gga Gly	tct Ser	ctt Leu 820	gca Ala	gat Asp	aca Thr	cca Pro	aac Asn 825	tgg Trp	ttt Phe	999 Gly	aac Asn	ctt Leu 830	aag Lys	cag Gln	2496
			_	_		tcc Ser	_	_				_				2544
-	-				-	ctg Leu 855				_	_		-			2592
cgc Arg 865	aac Asn	gca Ala	tat Tyr	gct Ala	gac Asp 870	gag Glu	aaa Lys	atg Met	aca Thr	ttc Phe 875	aga Arg	agg Arg	gga Gly	act Thr	ttc Phe 880	2640
cca	aat	ctc	agg	tgt	ctt	gat	att	tac	ttg	ctg	aag	caa	ctt	aga	gag	2688

Pro	Asn	Leu	Arg	Cys 885	Leu	Asp	Ile	Tyr	Leu 890	Leu	Lys	Gln	Leu	Arg 895	Glu	
	aga Arg						_		_	_	-	_		-		2736
	ggt Gly	_		_	-							_				2784
	ctt Leu 930															2832
	gtg Val															2880
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tgt Cys	tga *															2982
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Arg	Gln	Leu	Leu	Gly 245	Ala	Asp	Ser	Leu	Asp 250	Lys	Leu	Leu	Lys	Glu 255	Phe
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	Gly	275					280					285			
	11e 290					295					300				
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	Gly			325					330					335	
	Ile		340					345					350		
	Glu	355				-	360	-		-		365			•
	Val 370	-	_	_	_	375					380				-
385	Ile				390	_				395	_	_		_	400
	Leu			405					410					415	_
_	Met		420			-		425					430	•	
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_	450 Gly			_	_	455				_	460		_		
465	Asn				470					475					480
	Lys			485					490				_	495	
	Ser	_	500	_			_	505		-	_		510		
	Val	515					520				_	525	_		
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545					550					555					560
	Gly			565					570					575	
	Arg		580					585					590		
	Gln	595					600					605			
	Asn 610					615					620				
625	Lys				630					635					640
	Ala			645				-	650				•	655	
	Cys		660					665					670		
	Lys	675					680		_			685			
Thr	Ser 690	пте	Asn	rne	ser	Asp 695	Arg	val	гуѕ	ьеи	11e 700	Pro	Glu	IIe	Cys

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Gln Leu Arg Lys Leu Ser Val Thr Thr Lys Gly Ala Thr Asn Lys Lys
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Tyr Gln Ile Phe Cys Ala Ala Ile Glu Lys Leu Ser Ser Leu Gln Ser
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Leu Arg Val Asp Ala Glu Gly Phe Ser Asp Thr Gly Thr Leu Glu Trp
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Leu Asn Ser Ile Ala Cys Pro Pro Pro Phe Leu Lys Arg Leu Lys Leu
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Asn Gly Ser Leu Ala Asp Thr Pro Asn Trp Phe Gly Asn Leu Lys Gln
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Leu Val Lys Met Cys Leu Ser Arg Cys Gly Leu Lys Asp Gly Lys Thr
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Met Glu Ile Leu Gly Ala Leu Pro Asn Leu Met Val Leu Arg Leu Tyr
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Pro Asn Leu Arg Cys Leu Asp Ile Tyr Leu Leu Lys Gln Leu Arg Glu
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Ile Arg Phe Glu Glu Gly Thr Ser Pro Thr Met Glu Ser Ile Glu Ile
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Tyr Gly Cys Arg Leu Glu Ser Gly Ile Ile Gly Ile Lys His Leu Pro
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Arq Leu Lys Ile Ile Ser Leu Glu Tyr Asp Gly Lys Val Ala Lys Leu
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Asp Val Leu Gln Glu Glu Val Asn Thr His Pro Asn His Thr Glu Leu
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                   950
Gln Met Ala Glu Asp Arg Ser His His Asp Leu Gly Gly Leu Ala Ser
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Asp Gly Asp Asp Ala His Asp Asn Pro Ala Leu Arg Tyr Gln Thr Ser
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Cys
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atc agc aag gcc gcc tct gcc gct gcc aat gag acg agc ctc ctg ctc
                                                                  96
Ile Ser Lys Ala Ala Ser Ala Ala Ala Asn Glu Thr Ser Leu Leu Leu
qqc qtc qaq aaq gac atc tgg tat atc aaa gat gag cta aaa aca atg
Gly Val Glu Lys Asp Ile Trp Tyr Ile Lys Asp Glu Leu Lys Thr Met
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cag gca ttc ctt aga gct gct gaa gtt atg aaa aag aaa gat gaa cta

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_			_	-		aaa Lys	_			_	_					288
-	_	_				aga Arg		_				-		_		336
					_	gtt Val	_	_		_	_				_	384
						att Ile 135										432
		-	-	_		cgc Arg				-	_			_	~	480
_			-			tct Ser	_		_			_		_	_	528
	_			_		gat Asp		_	_	_	_		_	_	~	576
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						aag Lys 215										672
						agg Arg										720
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						gta Val							_		_	816
gag Glu	ctc Leu	aag Lys 275	gag Glu	aag Lys	agg Arg	tac Tyr	ttt Phe 280	gtt Val	gtt Val	cta Leu	gat Asp	gat Asp 285	cta Leu	tgg Trp	att Ile	864
						ata Ile 295										912

-	_		_	_	ata Ile 310	_						_	_			960
	_	_			gcc Ala		_					_		_	_	1008
					tca Ser											1056
					aat Asn											1104
					cgt Arg											1152
					cag Gln 390											1200
			-		gaa Glu				_	_	_	_	_		_	1248
					tac Tyr											1296
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				_	tgg Trp		_	_			_	_		_	_	1392
					gat Asp 470											1440
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					gat Asp 550											1680

	gac Asp															1728
	atg Met															1776
	aaa Lys	_		_	_		_	_	_	_		_			_	1824
	att Ile 610															1872
	cta Leu															1920
_	cta Leu		_			_				_	_					1968
	ata Ile															2016
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_	agt Ser 690	_	_		_	_				_	_			_	_	2112
	aaa Lys															2160
	ggt Gly	_	_	_	_		_	_				_	_			2208
cgg Arg	acc Thr	agt Ser	agt Ser 740	aga Arg	gca Ala	atc Ile	aaa Lys	gag Glu 745	ctg Leu	999 Gly	cag Gln	tta Leu	agc Ser 750	aag Lys	ttg Leu	2256
	aaa Lys															2304
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	aat Asn															2400
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805	810	815

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576

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tta aag gtt tgg gca gag caa ata cgt gac ctg tca tat gac att gaa Leu Lys Val Trp Ala Glu Gln Ile Arg Asp Leu Ser Tyr Asp Ile Glu 65 70 75 80	240
gat tcc ctt gat gaa ttt aag gtc cat att gaa agc caa acc cta ttt Asp Ser Leu Asp Glu Phe Lys Val His Ile Glu Ser Gln Thr Leu Phe 85 90 95	288
cgt cag ttg gtg aaa ctc aga gaa cgc cac cga att gct atc cgt atc Arg Gln Leu Val Lys Leu Arg Glu Arg His Arg Ile Ala Ile Arg Ile 100 105 110	336
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tac agt tta gtc aag cct att tcc tct ggc aca gag att gac atg gat Tyr Ser Leu Val Lys Pro Ile Ser Ser Gly Thr Glu Ile Asp Met Asp 130 135 140	432
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gct gag ctt gtt ggg ttt tct gac tcc aag aaa agg ctg ctt gaa atg Ala Glu Leu Val Gly Phe Ser Asp Ser Lys Lys Arg Leu Leu Glu Met 165 170 175	528
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Ser	Glu 210	Glu	Asp	Ile	Arg	Lys 215	Asn	Phe	Pro	Cys	Asn 220	Ala	Trp	Ile	Thr	
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						tct Ser										768
						gta Val										816
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						ata Ile 295		_		_			_			912
						gta Val										960
	_	_	_		-	tca Ser	_					_		_	_	1008
						ttg Leu										1056
						aaa Lys										1104
_			_		_	cta Leu 375			-						_	1152
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						ata Ile 455										1392

	atg Met													1440
	cga Arg													1488
	act Thr													1536
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	gtt Val 530													1632
	aaa Lys													1680
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	atg Met													1776
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	att Ile 610													1872
	cta Leu													1920
	cta Leu													1968
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	aaa Lys	_	_			_								2160

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agg Arg	aaa Lys	tta Leu 755	ggt Gly	gtg Val	aca Thr	aca Thr	aac Asn 760	999 Gly	tcg Ser	aca Thr	aag Lys	gaa Glu 765	aaa Lys	tgt Cys	aag Lys	2304
ata Ile	ctt Leu 770	tat Tyr	gca Ala	gcc Ala	att Ile	gag Glu 775	aag Lys	ctc Leu	tct Ser	tcc Ser	ctc Leu 780	caa Gln	tct Ser	ctc Leu	cat His	2352
gtg Val 785	gat Asp	gct Ala	gca Ala	gga Gly	atc Ile 790	tca Ser	gat Asp	ggt Gly	gga Gly	aca Thr 795	ctt Leu	gag Glu	tgc Cys	cta Leu	gat Asp 800	2400
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aag Lys	atc Ile	tac Tyr 835	tta Leu	ttg Leu	agg Arg	agc Ser	aaa Lys 840	cta Leu	aag Lys	gaa Glu	ggt Gly	aaa Lys 845	acc Thr	atg Met	ctg Leu	2544
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tgc Cys	agg Arg	ttg Leu 915	gaa Glu	tct Ser	G1y 999	att Ile	act Thr 920	ggt Gly	atc Ile	att Ile	cac His	ctt Leu 925	cca Pro	aag Lys	ctc Leu	2784
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965 970 975

tct ata gaa gtg caa aca gca gat cct gtt cct gat gcc gaa gga tca 2976

Ser Ile Glu Val Gln Thr Ala Asp Pro Val Pro Asp Ala Glu Gly Ser 980

gtc act gta gca gtg gaa gca acg gat ccc ctt ccc gag cag gag gga 3024

Val Thr Val Ala Val Glu Ala Thr Asp Pro Leu Pro Glu Gln Glu Gly 995

gag agc tcg cag tcg cag gtg atc acg ttg acg acg aat gat agc gaa 3072

Glu Ser Ser Gln Ser Gln Val Ile Thr Leu Thr Thr Asn Asp Ser Glu 1015

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3099

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Glu Asp Met Glu Ser Asn Lys Asn Met Gln Lys Met Val Glu Arg Ile
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Val Leu Ala Thr Lys Gln Val Ser Glu Trp Glu Lys Phe Tyr Glu His
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Leu Pro Ser Glu Leu Glu Ile Asn Pro Ser Leu Glu Ala Leu Arg Arg
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Phe Leu Tyr Leu Ser Ile Phe Pro Glu Asp Phe Glu Ile Lys Arg Asn
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Arg Leu Val Gly Arg Trp Ile Ala Glu Gly Phe Val Arg Pro Lys Val
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Gly Met Thr Thr Lys Asp Val Gly Glu Ser Tyr Phe Asn Glu Leu Ile
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Asn Arg Ser Met Ile Gln Arg Ser Arg Val Gly Ile Ala Gly Lys Ile
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Lys Thr Cys Arg Ile His Asp Ile Ile Arg Asp Ile Thr Val Ser Ile
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Ser Arg Gln Glu Asn Phe Val Leu Leu Pro Met Gly Asp Gly Ser Asp
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Leu Val Gln Glu Asn Thr Arg His Ile Ala Phe His Gly Ser Met Ser
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Cys Lys Thr Gly Leu Asp Trp Ser Ile Ile Arg Ser Leu Ala Ile Phe
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Gln Lys Asp Phe Asp Arg Ile Ala Leu Leu Cys His Leu Lys Tyr Leu
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Ser Ile Gly Tyr Ser Ser Ser Ile Tyr Ser Leu Pro Arg Ser Ile Gly
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Lys Leu Gln Gly Leu Gln Thr Leu Asn Met Pro Ser Thr Tyr Ile Ala
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Ala Leu Pro Ser Glu Ile Ser Lys Leu Gln Cys Leu His Thr Leu Arg
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Cys Ile Gly Gln Phe His Tyr Asp Asn Phe Ser Leu Asn His Pro Met
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Lys Cys Ile Thr Asn Thr Ile Cys Leu Pro Lys Val Phe Thr Pro Leu
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Thr Lys Ser Cys Trp Ser Glu Ser Ile Gly Val Lys Val Pro Lys Gly
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Ile Gly Lys Leu Arg Asp Leu Gln Val Leu Glu Tyr Val Asp Ile Arg
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Arg Thr Ser Ser Arg Ala Ile Lys Glu Leu Gly Gln Leu Ser Lys Leu
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Arg Lys Leu Gly Val Thr Thr Asn Gly Ser Thr Lys Glu Lys Cys Lys
                         760
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Ile Leu Tyr Ala Ala Ile Glu Lys Leu Ser Ser Leu Gln Ser Leu His
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Val Asp Ala Ala Gly Ile Ser Asp Gly Gly Thr Leu Glu Cys Leu Asp
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                                    795
Ser Ile Ser Ser Pro Pro Pro Leu Leu Arg Thr Leu Val Leu Asp Gly
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Ala Tyr Leu Gly Glu Lys Leu Val Phe Lys Thr Gly Ala Phe Pro Asn
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                                       875
Leu Arg Thr Leu Trp Ile Tyr Glu Leu Asp Gln Leu Arg Glu Ile Arg
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Phe Glu Asp Gly Ser Ser Pro Leu Leu Glu Lys Ile Glu Ile Gly Glu
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Cys Arg Leu Glu Ser Gly Ile Thr Gly Ile Ile His Leu Pro Lys Leu
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Lys Glu Ile Pro Ile Arg Tyr Gly Ser Lys Val Ala Gly Leu Gly Gln
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Leu Glu Gly Glu Val Asn Ala His Pro Asn Arg Pro Val Leu Leu Met
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Tyr Ser Asp Arg Tyr His Asp Leu Gly Ala Glu Ala Glu Gly Ser
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Ser Ile Glu Val Gln Thr Ala Asp Pro Val Pro Asp Ala Glu Gly Ser
            980
                                985
Val Thr Val Ala Val Glu Ala Thr Asp Pro Leu Pro Glu Gln Glu Gly
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                           1000
                                               1005
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Leu Phe Gly Asp Glu Arg Pro Lys Glu Leu Ser Pro Pro Phe Cys Ser
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Pro Gln Leu Lys Met Leu Arg Val Leu Asp Leu Leu Asp Ile Ile Phe
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Ser Asn Gly Gly Pro Val Val Gly Met Val Ala Ser Gly Asn Gln Ser
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Cys Leu Ala Ile Asp Ser Tyr Ala Glu Asp Ile Arg Asn Gln Ser Ala
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Arg Asn Val Asp Glu Ala Glu Leu Val Gly Phe Ser Asp Ser Lys Lys
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	gct Ala															480
	gat Asp	_		-						_		_	_			528
_	caa Gln	_	_			_					_					576
	tac Tyr	_		_			_		_				_	_		624
	gat Asp 210															672
	cct Pro	_			_	_		_			_					720
	gtt Val	_				_	_	_		_		_				768
	gat Asp	_		_												816
	aat Asn															864
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	aca Thr															960
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